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17 December 1957

MEMORANDUM FOR: Office of Logistics/Procurement Division/Contract Branch/Administration Section

SUBJECT : Contract RD-111, Task I, with [redacted] 25X1
[redacted] 25X1
for Extension of Time

1. Task I under Contract RD-111 for the development of an underwater caching package for short term immersion of outboard motors expired on 24 November 1957.

2. On 13 December this office received Progress Report No. 314 wherein the contractor requested additional time under this task. This extension of time would enable the contractor to submit the container to various leak tests as well as compile material for a conclusive final report.

3. It is therefore requested that the expiration date of Task I under Contract RD-111 be extended from 24 November 1957 to 21 March 1958.

4. No increased allotment of funds is anticipated as a result of this time extension.

[redacted] 25X1
Chief
TSS/Engineering Division

RD/P/TSS/ED/ec

Distribution:
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[redacted] 25X1

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25X1

December 10, 1957

Reference: P.N. 528

Rec'd ED 12/13/57 1400

Attention: Howie

Attached is a copy of Report No. 314 Supplement "A", Progress Report - Waterproof Container, dated December 10, 1957.

Very truly yours,

25X1

Central Development Department

rck

att.

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25X1

REPORT 314 Sup. "A"

MODEL

DATE 12-10-57

TITLE

PROGRESS REPORT - WATERPROOF CONTAINER

PN-528

SUBMITTED UNDER

Contract RD-111

PREPARED BY

25X1

REFERENCE:

APPROVED BY

25X1

CHECKED BY

Photos 14890-1
14890-2
and Sample Data

NO. OF PAGES 11

NO. OF DIAGRAMS

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED

FORM 962

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ANALYSIS
PREPARED BY
CHECKED BY
APPROVED BY

PAGE Index 25X1
REPORT No. 314 Supp. A 25X1
MODEL
DATE 12-10-57

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ANALYSIS
PREPARED BY
CHECKED BY
APPROVED BY

25X1
25X1 A
REPORT No. 314 Supp.
MODEL
DATE 12-10-57

I. The purpose of this report is to augment our prior report No. 314 in logging progress achieved in the performance of Contract RD-111 for the development and prototype delivery of two water proof containers. Two methods of closures are to be attempted, one a double slide closure, the other a dove-tail bead type closure.

We have logged monthly progress for September and October in Section V of this report.

II. The methods intended for this period remained unchanged, namely:
To survey and select suitable container fabrication material

To accommodate our double slide closure to use on subject containers.

To accommodate a dove-tail wire bead (or equal) closure within the container design.

To deliver a prototype bag for each of the two designs.

III. The conclusions arrived thus far may be summarized as follows:

A. Pertaining to the selection of optimum container material:

1. We have further confirmed a laboratory technique for laminating a foil suitably to a neoprene coated base cloth. Our [redacted] is evaluating the feasibility of processing such material on a production basis using our avilable calendering facilities. No pilot run of such material has been contemplated until this type of laminate is established as optimum. 25X1

2. Through discussions with Dobeckmum Company personnel we have obtained samples of "aluminized" film such as saran in the attempt to laminate this film with neoprene coated base fabric. Providing the aluminizing furnishes an improved barrier to water transmission one advantage in a saran film laminate would be in the stretchability of the laminate which offers a great advantage in the fabrication techniques employed to build a container. The lack of strength or "warping" of the alum foil laminate renders the use of such material awkward in building a container.

3. Even if the "aluminizing" of saran is not conducive to increasing the barrier to water transmission we are inquiring into the use of saran and several new stretchable films as suitable laminates in themselves.

4. Dobeckmum's attempts to aluminize several of our neoprene sheets and several samples of Haartz-Mason and Vulcan coated fabrics were not successful. The primary defection was in the overheating or charring of the alum spray or rubber during the required high heat inherent in the process.

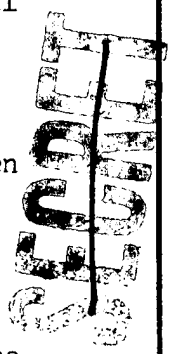
5. Until receipt of properly sheeted saran and films which must then be laminated to our available coated stocks and tested for water transmission, requiring about 30 days, the status of our search for optimum container material remains on the level of inquiry into possible combination of laminate materials.

B. Pertaining to fabrics now being used to construct test containers:

1. Comparative data of a limited number of water transmission tests vs the usual MVT tests of available coated fabrics indicate that transmission of water contacting the material runs as high as 4 times the amount generally indicated in MVT tests.

2. Generally, the pre-cured coated material offers utmost reliability as a barrier to water transmission, well chosen adhesives assure strength in peel and tensile tests very comparable to that of vulcanized seams.

   Consequently trial containers of both the vulcanized and air-cure construction have been added to the yellow container demonstrated. All are awaiting satisfactory closure assemblies.



C. Pertaining to the slide closure:

1. Since demonstration of the 18" closure last October, a new mold for a 70" closure has been obtained. Several attempts for its use has indicated revision of the central core section which proved too fragile to withstand shearing of rubber during closure.

2. Our compounders have run experimental amounts of several softer stocks designed to provide easier molding. The first compound was found to have too low a tear resistance. The latter compound has not yet been molded or evaluated.

3. Upon successful molding of the sealing section we anticipate installation of the slide fasteners and metal seal upon a six inch diameter fabric cylinder for preliminary leak tests.

4. Subsequently a duplicate assy will be attached to each of the three containers from which one will undergo a 24 hr, a 48 hr, a week and a month's leak test under a 15 ft. head of water.

5. We consider our procedure to be on the threshold of a usable closure.

D. Pertaining to a dove-tail bead or similar closure:

1. Hand built, drum cured models of this closure are too variable in dimensions to permit adequate evaluation.

2. From the point of molding, this approach is apt to require considerable "trail and error" in defining proper molded configuration.

3. Our progress in this approach has been only fragmentary.

E. Pertaining to accommodation of closure to prototype containers to be delivered as suitable for testing:

1. From our discussion of closure progress above we foresee possible a container suitable for our tests in four weeks.

2. A subsequent program of 5½ weeks testing is required.

IV. Recommendations:

A. To provide relief for time delay experienced in re-working mold and devising suitable compound for molding it is requested a target date for assembled prototype be made January 15, 1958.

B. To provide 5½ weeks leak testing at our facility a finished target date for February 21, 1958, is suggested.

C. That those phases of lamination enumerated above be completed with min. effort possible to provide positive or negative evaluation of commercial feasibility of a practicable laminate.

D. A final report on effort & delivery be presented by March 21, 1958.

E. The balance (10%) of funds to be utilized to finish laminate tests now under way and to finish assembly of a prototype suitable for testing. Enough funds should be available to provide a final report.

V. The following activity was logged against PN-528:

A. Pertaining to obtaining optimum laminate material:

Work Request No. 1 (8/15/57 to 9/20/57)

Moisture vapor transmission of Haartz-Mason yellow life vest nylon, coated one side, Neoprene, MIL-C-19377.

Tested to ASTM E-96 with sample data sheets attached.

Observation: The MVT data obtained was exceeded by almost five to one when samples were exposed to contact with liquid water. This contact figure we have termed Water Transmission Rate, or WT data.

Work Request No. 2 (8/23/57 to 8/30/57)

Lap seam tensile test using C-165 air cure cement on Haartz-Mason nylon fabric, coated one side, Neoprene, yellow, MIL-C-19377.

Observation: Poor peel and tensile results using GTR cement. Regarded unusable for container.

Work Request No. 5 (9/10/57 to 10/16/57)

Laminating H & M twill life vest fabric, MIL-C-19377:

1. Neoprene to Neoprene uncured.
2. Neoprene to pliofilm over Mylar cured.
3. Neoprene to aluminum over polyethylene cured.

Observation task No. 1: Accomplished in 30 minute press cure at 300° F. Results: Peel and tensile test satisfactory.

Observation task No. 2: Former attempts unsuccessful due to blistering of pliofilm and delamination thereof. Such defects voided this test by not cementing pliofilm. Cement used on Neoprene was Angier Airdry, Neoprene type without accelerator.

Sample of this laminate was demonstrated October 16, 1957.

Observation task No. 3: (Sample similar to Task No. 2 using pliobond was demonstrated October 16, 1957) Improved lamination obtained through use of Bostick 4025/MEK cement, 5 minutes at 250° F. at 100 PSI ram.

Work Request No. 6 (9/10/57 through 10/16/57)

Water transmission of sample in Task No. 3 of Work Request No. 5:

Observation: Consistent test results were not obtained because of doubtful seal. Good seal between cup and nylon portion of Neoprene fabric was difficult to obtain. Results: Inconclusive.

Work Request No. 7 (10/3/57 through 11/7/57)

Water transmission test of Vulcan #7136 fabric, 3 oz. nylon, Neoprene coated, .022 ga., cured.

Observation: Rate of water transmission is about one-half that of the MIL-C-19377 Haartz-Mason used in first yellow container demonstrated October 16, 1957. (4.4 to 5.1 MG/24 hrs./in.^{2}/ complete fabric thickness.) This is also in accordance with data published by Vulcan.

Work Request No. 8 (10/3/57 through 11/7/57)

Water transmission test Vulcan fabric, style #4137, Neoprene coated, 5 oz. nylon, .032 ga.

Observation: Best water transmission rate thus far, about 25% permeation of Haartz-Mason fabrics. It should be noted that this gage exceeds Haartz-Mason fabric by about 10 mils.

Work Request No. 9 (10/3/57 through 11/7/27)

Water transmission test Vulcan Buna "N" coated 3 oz. nylon, style #7203, .022 ga.

Observation: Water transmission rate equals .032 Neoprene in Work Request No. 8. This material practically impossible to obtain satisfactory seams in open steam.

Work Request No. 10 through 22

Research & Development Laboratories have been entered with primary emphasis on obtaining water transmission rate of various materials and laminates. For example, a repeat on the above tests are made on some samples in which the laminate film has been perforated several places so that we may check the degree of channeling, or wicking, of the leak between the laminating layers. Our most recent requests have emphasized the use of a stretchable type film which may be applicable in the development of a material for wrapping items for storage as well as for use in the subject container.

B. Pertaining to the waterproof container development:

1. A 70" mold, as shown in photos 14890-1 and -2, was drawn up and prints sent to General Metals for fabrication. Delivery: 4 weeks.

2. Both cured and uncured fabrics from Haartz-Mason were fabricated into prototype containers, however, the container and a number of various sample seams of the "uncured" type fabric proved inferior in both seam strength and predictable shrinkage. Haartz-Mason personnel later advised this type material not suitable for open steam cure.

3. A T-15 tread stock was used to load the 70" mold when received, however, improper prewarming of stock lead to warping of core of mold upon ram closure. Rework of core again resulted in 1½ week delay.

4. Specially soft loading compounds have been utilized to accommodate use of mold with easily warped core, the results of which are also shown in accompanying photos. These inserts have not as yet been assembled into a zipper closure. An improved modulus stock is being tried for this mold.

5. The better of the two seals will be assembled on body fabric made to fit a steel mandrel for preliminary leak tests.

6. Pending the above, duplicate construction will be employed on a suitable prototype container.

(1) General Tire Photo

SECRET

(-2)

General Tire Photo

1 4 8 9 0

SECRET

SAMPLE DATA

Central Development Request No. 1 Date 8-15-57

Seaplane Handling Study

Attn: Mr. Sanger: Research & Development

Request: Attached sample, Hearty Mason, Neoprene on Nylon Twill, life vest material, .009 gage, MIL-C-19377, cured. Moisture Vapor Transmission to ASTM D697 (grams/24 hr/m²/mm thickness/cm Hg @ 25°C). Resistance to cold.

Replaced by E 96.

PN # 528

Requested by [redacted] 25X1
Name

Intended use:

SECRET

Your comments are invited.
Before returning this folder labeled ( ) please check:

1. Total hours labor: Technician - 4 hours
   Clerical
   Administrative - 10 hours
2. Charges for material: Outside
   Inside
3. Any charges for tooling, outside services, etc., should be noted to our attention.
4. Are references sufficient to relate charges to description of work done?

SAMPLE DATA

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CENTRAL RESEARCH LABORATORIES

Analytical Request Sheet

Sample No.: _____ Analytical Order No.: 5717

Date Submitted: 8/19/57

Project No.: MIL-C-19377 Date Completed: 9/13/57 9-16

Submitted By: Ted Dettling Location of Data: A III-67, A XIX 96

No. of Samples: 1

Sample Description and Composition: Yellow Neoprene sheet - Hardy-Mason Fabric Mil-C-19377

Requests: (1) Moisture Vapor transmission - mg/24 hrs/sq inch/mil of thickness - also per thickness of film. - Relative humidity in cup 100%, RH in desiccator 0%. 23° C. (Cup upright)

(2) Water transmission - milligrams/24 hrs/sq inch/mil of thickness - also per thickness of film - RH in cup 100%, RH in desiccator 0%. (Cup inverted) 23° C

(3) Thickness of neoprene on fabric

(1)	per mil of coating thickness	per thickness of coated fabric	coated fabric thickness	Neoprene thick
	5.27 mg.	1.77 mg.	9.5 mils	2.98 mils
	6.50	2.18	9.2 mils	
	5.60	1.88	9.3 mils	
(2)	28.28 mg.	9.49 mg	9.5 mils	2.98 mils
	29.44	9.88	9.2	
	28.04	9.41	9.3	

T. Long

Microscope Examination of 8 Cross Sections:

Aver. Thick	Neoprene	Nylon
9.55 mils	2.98 mils	6.5 mils

A-III-67 (45 min.)
L.C.

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EXPENDITURES ON PN-528

	Estimate 100%	Used End Oct.	Used %
Engineering	$1,308.00	$1,923.56	147
Labor	1,356.00	866.82	63.9
Research	1,232.00	651.90	52.9
Material	460.00	448.73	98
Purchases	260.00	182.84	70
Total	$4,616.00	$4,073.85	88.2%
Balance		542.15	11.8%

1. Engineering requirement higher than anticipated because need for mold and repeated revisions not in original estimate.

2. Much engineering and research combined planning for laminates are venturing into a "task 2" or "wrapping material for storage" phase.

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